The Arts Advantage: Impacts of Arts Education on Boston Students

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INTRODUCTION

The arts provide an abundance of formative educational opportunities, but the extent to which schools realize educational benefits from these opportunities remains largely unknown. Advocates maintain that the arts have intrinsic value in K-12 education. However, policymakers have come to increasingly rely on scientific-based research in their decision-making (Slavin, 2002). This reliance has coincided with school administrators' intensified focus on state-assessed educational outcomes, particularly standardized tests, which have prompted significant reductions in the arts and other non-tested subject areas (Bassok et al., 2016; Dee et al., 2013; Gadsden, 2008; Murnane & Papay, 2010; West, 2007; Yee, 2014). Few states and districts currently include arts education measures in their accountability systems (Kisida et al., 2017), and rigorous scientific-based empirical investigations of arts education are rare (Elpus, 2013; Winner et al., 2013). Consequently, conducting scientific-based arts educational investigations has been a challenge, but these efforts are crucial to the preservation of the arts in schools.

Recent randomized control trial (RCT) studies have provided empirical evidence that the arts can improve educational outcomes (e.g., Bowen et al., 2014; Bowen & Kisida, 2019; Greene et al., 2014; Kisida et al., 2014; Kisida et al., 2016). Specifically, these studies have found that arts learning positively impacts students' critical thinking, discipline, writing achievement, compassion for others, and future arts engagement. However, these studies have been limited by relatively short evaluation periods and circumstances that may not generalize well to more common, everyday educational settings.

In this study, we provide a critical contribution to this growing body of research through a quasi-experimental, longitudinal investigation of arts educational impacts for K-12 students enrolled in Boston Public Schools (BPS) with data from the 2008-09 through the 2018-19 school years. We have merged student-level BPS administrative datasets with annually-collected,

school-level arts data on educational participation, resources, and opportunities. We also merge these datasets with school-level climate survey data that BPS has collected from students and teachers since the 2009-10 school year. These data provide 616,273 K-12 student-level observations, enrolled in 171 traditional public schools, over eleven school years, and allow us to investigate whether variation in arts education affects students' attendance, discipline, and standardized test scores in math and English language arts (ELA). We also use student and teacher school-level survey data to examine changes in school climate, school and community engagement, and students' enthusiasm for art.

Our main analytic approach leverages the timing of student-level arts course-taking in regression models that control for student and school fixed effects, eliminating many of the potential threats to the validity of our estimates. We find that when students are enrolled in arts courses, their attendance modestly improves by 0.2 percent, or roughly one-third of a day in a standard 180-day school year. This effect translates into nine additional days of instruction for a class of 25 students. The positive effect on attendance is robust across grade level, gender, race/ethnicity, economic status, and English-language learner (ELL) program participation. These effects are substantially larger for students with an individualized education plan (IEP) and for students who have a history of chronic absenteeism. Students with IEPs experience positive attendance effects that translate to 0.7 of an additional day attended per year when enrolled in an arts course. Students who have been chronically absent experience the greatest impacts, attending 1.1 more days per year when enrolled in arts courses. We also find evidence to suggest that arts course enrollment slightly increases student suspension rates, though these effects are not practically significant. While we do not observe significant effects with the

overall sample on ELA and math achievement, we observe small increases in ELA and math achievement for middle schoolers of 0.03 and 0.01, respectively.

We investigate variations in school-level arts educational resources and climate survey data using school fixed effects analyses. Analyses of student and teacher surveys reveal that teachers report higher levels of student and parent engagement when more students are enrolled in arts courses. We do not find any significant effects with any of our other student or parent climate survey constructs. We also do not find any significant effects resulting from changes in school-level arts educational resources and opportunities.

These findings have important policy implications for the role that arts education plays in improving student and parent school engagement. These findings are also critical for developing an empirical body of evidence to inform policy decisions regarding the provision and allocation of arts educational resources and opportunities. This study also advances what we know about the impacts of arts educational opportunities in common, authentic school settings and generates new hypotheses for this field of research.

BACKGROUND

Education theorists contend that learning is both a social and emotional endeavor, and that students develop socially and emotionally in supportive contexts that provide active learning through direct engagement with the world and opportunities to reflect on their experiences (Dewey, 1954; Farrington et al., 2019; Nagaoka et al., 2015). The arts can provide powerful educational opportunities for students to encounter and contribute to the world and reflect on their own experiences and cultures as well as those of others, thus promoting social and emotional learning and development (Eisner, 1992; Ladson-Billings, 1994). By providing contexts that support social and emotional learning and development, schools develop trusting

relationships with students that may lead to a host of positive educational outcomes (Deasy, 2002; Farrington et al., 2019; Fiske, 1999).

Despite strong theoretical underpinnings, there is limited empirical evidence to imply that arts learning opportunities generate causal effects on policy-relevant educational outcomes. However, there are a few such studies that have yielded promising findings. In an RCT study of the Crystal Bridges Museum of American Art's school visits program, researchers found that arts exposure improved students' critical thinking and increased their motivation to acquire cultural capital (Bowen et al., 2014; Greene et al., 2014; Kisida et al., 2014; Kisida et al., 2016). In the American Institute for Research's extensive review of the literature in 2018, the Crystal Bridges studies were the only to provide "strong evidence" for arts interventions positively affecting PK-12 education outcomes based on the U.S. Department of Education's What Works Clearinghouse standards (Ludwig et al., 2017; Wan et al., 2018). More recently, Bowen and Kisida (2019) conducted a RCT investigation of substantial increases in schools' arts educational opportunities, and found that these increases improved student discipline, writing achievement, and students' compassion for others.

These RCT studies provide empirical foundations for the arts' causal impacts on educational outcomes. There are, however, some notable limitations to these studies that implore further research. RCTs tend to have limited evaluation periods. The Bowen and Kisida (2019) RCT evaluation of Houston's Arts Access Initiative is the longest of the aforementioned experimental studies, yet it only lasted for two school years. RCTs also tend to take place within settings and circumstances that tend not to be common education settings, which prompts questions about the generalizability of their findings. Therefore, despite these positive findings,

there remain important questions about whether, and the extent to which, more common, authentic school-based arts learning experiences yield educational benefits.

In addition to shedding light on the kinds of benefits students receive from the arts, prior studies suggest underserved students are particularly reliant on schools to provide art learning experiences. Historically-marginalized populations receive substantially less exposure through out-of-school, family-facilitated experiences (Kisida et al., 2014; Meyer et al., 2004; Redford et al., 2018). Prior studies have also shown that historically-marginalized students demonstrate more-pronounced, positive impacts from school-sponsored arts exposure, suggesting that these interventions reduce gaps in educational outcomes tied to arts-educational activities (Bowen & Kisida, 2019; Catterall et al., 2012; Kinney & Forsythe, 2004; Kisida et al., 2014; Podlozny, 2000; Thomas et al., 2015). Unfortunately, gaps in out-of-school experiences often mirror gaps within public education, as schools that predominantly serve higher populations of students in poverty or racial/ethnic minorities tend to provide fewer arts education opportunities.

DATA & MEASURES

Our study primarily uses BPS student-level administrative data from the 2008-09 through 2018-19 school years. BPS administrative data includes student-level demographics, as well as annual attendance, discipline records, and standardized test scores. We merged these data with data on student-level enrollments in arts courses. We also also use BPS's school-level climate survey data from students and teachers in 2009-10 and from 2012-13 through 2018-19.[1] We merged these data with the Massachusetts Department of Education's school-level data for arts teacher full-time equivalents (FTEs). Finally, we employ a dataset from EdVestors, a Boston-based school improvement nonprofit organization that collects annual arts educational data

[1] BPS also provided us with parent climate survey data, but response rates were too low to conduct analyses with these data.

directly from schools. One of EdVestors' major initiatives is the BPS Arts Expansion, which aims to "expand access and equity in arts education." A core component of this initiative is collecting data from all BPS schools to track and analyze students' arts learning opportunities and resources. These data have been collected since 2008-09.

Our primary student-level independent variable of interest is an annual indicator of students' arts course-taking. This variable is constructed with student-level course records as a dichotomous variable indicating whether a student enrolled in at least one arts course over the course of the school year. We also examine a host of school-level arts educational input variables, including the Massachusetts Department of Education's data on school-level annual number of arts FTEs, as well as EdVestors' annually collected indicators of school-level number of arts disciplines offered and number of community arts partners.

Our dependent variables of interest are student-level attendance, measured as a percent of days present, excluding excused absences; an indicator for whether a student received an in-school or out-of-school suspension;[2] and math and ELA standardized test scores. Attendance and suspension data were collected on all students in our sample. Math and ELA standardized tests were administered to students in grades 3-8. We also examine a host of school-level dependent variables using BPS student and teacher climate survey data. With student climate survey data, we have formed constructs that measure students' arts enthusiasm, sense of belonging at school, learning engagement, and school safety. With teacher survey data, we have formed constructs for student engagement, parent engagement, school-community engagement, student relations, and teacher collegiality. We initially formed constructs based on identified survey item themes and then examined and altered these constructs through exploratory factor analyses. The composition

[2] Eighty-eight percent of the suspensions over this time period were out-of-school suspensions.

of each of these constructs, along with Cronbach's alpha measures of internal consistency, are provided in appendix Tables A1 and A2.

SAMPLE

From the BPS administrative data, we have a sample of 616,273 K-12 student-level observations, enrolled in 171 traditional public schools, over eleven school years, from 2009-10 to 2018-19. In terms of race/ethnicity, 41 percent of students are identified as Hispanic/Latinx, 36 percent as African-American, 13 percent as white, and 9 percent as Asian. Seventy-six percent were identified as being economically disadvantaged. Twenty percent of students were on an IEP and 29 percent received ELL program services. On average, 18 percent of the students were "chronically absent" in a school year, defined as missing ten percent or more of days enrolled. Student descriptive statistics are provided in Table 1.

The independent variables from the Massachusetts Department of Education and the EdVestors Arts Expansion survey were collected at the school level. There are 1,482 school-level observations from the BPS administrative data over this eleven-year time period, and we have observations for 87-99 percent of schools for these arts variables. On average, 62 percent of a school's students took at least one arts course, with substantial variation ranging from 0 to 100 percent. The mean number of school arts teacher FTEs was 1.9 with a standard deviation of 2.0. The average school had 1.6 partnerships with outside arts organizations or institutions, with a standard deviation of 1.7. Schools offered a mean number of 2.6 (out of 5) different arts disciplines. The majority of schools offered visual arts (80 percent) and music (74 percent); theater (44 percent), dance (40 percent), and media arts (24 percent) were less common (Table 2).

EMPIRICAL METHOD

Our goal when conducting the student-level analysis is to estimate the causal effect of taking an arts course on students' behavioral and academic outcomes. An ideal strategy would be to randomly assign students to arts courses or not in order to net out any potential confounding factors. Merely comparing students in arts courses to those who do not enroll would likely be biased by selection if they have some choice regarding the decision or timing of enrollment in an arts course. Moreover, the availability of arts courses within schools are certainly nonrandom and likely related to other attributes related to school quality, and some schools may assign or encourage students to take arts courses based on student attributes.

Our primary identification strategy addresses these concerns by leveraging variation in the assignment and timing of taking an arts course within a regression model that holds constant student and school fixed effects. This controls for the time invariant factors that are fixed for students and schools. Our model takes the following form:

$$Y_{igst} = \alpha + \beta ArtsCourse_{igst} + \rho \boldsymbol{X}_{st} + \delta_i + \gamma_g + \theta_s + \rho_t + \epsilon_{igst}$$

Y_{igst} represents our outcomes of interest: student attendance rates, suspension incidents, and standardized math and reading scores for student *i*, in grade *g*, in school *s*, at time *t*. $\boldsymbol{X}_{st}$ is a vector of time-variant school characteristics including percent minority, percent of students in poverty, percent of students with an IEP, percent of students who are English-language learners, and school size, and δ_i, γ_g, θ_s, and ρ_t are student, grade, school, and year fixed effects. *ArtsCourse* is a dummy variable indicating the student is enrolled in an arts course, and we are primarily interested in β, which captures the effect of taking an arts course on our outcomes.

Because effects of taking an arts course likely differ for students by subgroup identifications that have historically correlated with variations in educational outcomes and arts

learning outside of school, we also estimate models restricted to students in grade-levels K-5 and 6-12, female and male students, economically disadvantaged students, students receiving ELL services, students with IEPs, African-American, Hispanic/Latinx, and white students, and students who have patterns of chronic absenteeism, which we define as being chronically absent for at least two school years.

Our analyses of school-level arts resource variables and student and teacher survey outcomes are aggregated to the school level. For these analyses, we are also concerned that unobservable school characteristics may confound relationships between indicators of arts exposure and resources and our outcomes. We address this concern by leveraging variation in arts indicators over time in a regression model that includes school fixed effects, holding constant schools' time invariant characteristics. This model takes the following form:

$$Y_{st} = \alpha + \beta Arts_{st} + \rho \boldsymbol{X}_{st} + \theta_s + \rho_t + \epsilon_{st}$$

Y_{st} represents our outcomes of interest, including various survey measures of school engagement and climate in school *s* at time *t*. $\boldsymbol{X}_{st}$ is a vector of time-variant school characteristics including percent minority, percent of students in poverty, percent of students with an IEP, percent of students who are receiving ELL program services, and school size; θ_s and ρ_t are school and year fixed effects. *Arts* represents our independent variables of interest, which are percent of students taking an arts course, the number of arts disciplines offered, the number of arts FTEs, and the number of community arts partners. We are primarily interested in β, which captures the effect of school-level arts education indicators on our outcomes.

RESULTS

Our primary analysis examines the effects of individual students taking an arts course in a particular school year, across the full sample and by a host of relevant student subgroups (Table 3). Overall, we find significant effects on increased student attendance and suspensions. The

overall average daily attendance effect is a 0.2 of a percentage point increase, which translates to roughly one third of a day in a 180-day school year. We also find a significant effect on student suspensions that amounts to a 0.3 of a percentage point increase in the likelihood of a student being suspended over the course of an entire school year. We find no significant effects on students' math and reading achievement for the full sample.

The attendance result is consistently positive with some notable variation across subgroups. Results by grade-level suggest that increases in student attendance are largely driven by students in elementary and middle school. Students with IEPs experience an effect that is twice the magnitude of the overall effect, translating to about two-thirds of an additional day per school year. We observe the largest effect for chronically absent students, a 0.06 percentage point increase, which translates to 1.1 additional days in an average school year when enrolled in an arts course.

The suspension effect is fairly inconsistent across subgroups, and appears to be largely driven by high schoolers, males, students with IEPs, and chronically absent students. While these results are statistically significant, these effects are not practically significant.

Finally, though we do not find an overall effect on ELA and math achievement, we do find positive effects in ELA and math achievement for middle school students of 0.03 and 0.01 of a standard deviation, respectively. This finding prompted further investigation of outcomes by elementary and secondary school student subgroups (Tables 4 and 5). When we analyze these subgroup achievement effects, there does not appear to be much variation across middle school subgroups for ELA achievement, with the exceptions of slightly stronger impacts for African-American and white students. For math achievement, we find small positive impacts for white

students and very small negative impacts for students receiving ELL and IEP services, but none of these effects appear to be practically significant.

We next turn to results where we examine impacts at the school level employing a school-level fixed effects model. We examine the impacts of variations in arts resources and opportunities on school attendance rates, suspension rates, and average ELA and math achievement. We do not find any significant effects on these outcomes for school-level percent of students taking arts courses, number of arts disciplines offered, number of arts teacher FTEs, or number of arts partners (Table 6).

Finally, we examine the impacts of school-level arts resources and opportunities on student and teacher climate survey outcomes. When we look at our outcomes derived from teacher surveys, the percent of schools taking an arts course has positive and significant effects on teacher reports of student and parent engagement (Table 7). We see no effect on school-community engagement, student relations, or teacher collegiality for any of the arts education indicators we examine. We also do not find any significant effects with any of the student climate survey outcomes (Table 8).

DISCUSSION & CONCLUSION

Employing a student and school fixed effects approach with a longitudinal dataset that spans 11 years, we find consistent evidence that when students are enrolled in arts courses, their attendance improves. This finding is consistently positive across a range of student characteristics. While the effect is modest in magnitude from a student perspective, the implications for educational administrators and policymakers are notable. Given a standard 180-day school year; this effect translates into nine additional days of instruction for a class of 25 students. Most notably, we find the largest effects for students with IEPs and students who have a pattern of being chronically absent. For chronically absent students, this effect equates to

roughly an additional 1.1 days present when enrolled in an arts course. Given the heightened focus on combatting chronic absenteeism (Gottfried & Hutt, 2019), this result has important implications for educational administrators who are seeking ways to engage struggling students important.

Though our main motivation for arts learning is not to produce student test score gains, the fact that we observe small improvements in ELA and math achievement for middle schoolers is a good indicator that arts learning may have some spillover effects, and does not appear to crowd out student performance in other subjects. Or analysis of school surveys provides additional evidence that the relative strength of a school's arts environment affects student and parent engagement. Teachers report that both students and parents are more engaged as the percent of a school's students taking arts courses increases.

The small increases in suspension rates are puzzling, as we are not aware of any prior research that has found that arts education experiences contribute to more disciplinary infractions. In fact, the only causal study that addresses this question found that arts learning reduces student disciplinary infractions (Bowen & Kisida, 2019). One possible explanation is that students involved in the arts, especially in middle or high school, tend to spend more time at school beyond the regular school day. It is possible that spending more time at school simply provides additional opportunities to for students to get into trouble. That said, the magnitude of the effects we observe would not be considered practically significant.

Taken together, our findings shed new light on the role that arts education plays in improving school engagement. Students receiving the arts in school attend more, are more engaged, and their parents are more likely to participate in school activities. As education administrators and policymakers struggle for ways to connect with students and their parents,

these results suggest one strategy for generating social capital to provide a robust school climate is through providing arts education as a core ingredient in a well-rounded education. Such results are critical for developing a body of evidence to guide decisions by school district and state policymakers and administrators, who often have to make difficult decisions with constrained resources.

This study provides a much-needed foundation for future research in arts education and generates new hypotheses for the field. Because we were able to examine the relationships between variations in arts education and experiences relative to critical educational outcomes in everyday school settings, this study provides a more solid foundation for building theory, designing interventions, and guiding future evaluations.

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Table 1

Student Demographics

Variable	N	Mean	Std. Dev.	Min	Max
Grade Level	616,273	6.038	3.822	0	12
Female	616,263	0.484	0.500	0	1
Race/Ethnicity					
Asian	616,260	0.086	0.280	0	1
African-American	616,260	0.363	0.481	0	1
Hispanic/Latinx	616,260	0.406	0.491	0	1
White	616,260	0.129	0.335	0	1
Economically Disadvantaged	616,273	0.757	0.429	0	1
IEP	616,273	0.198	0.399	0	1
ELL	616,273	0.289	0.453	0	1
Chronically Absent	614,949	0.177	0.381	0	1

Note: Grade level coded such that kindergarten set equal to zero. Chronically Absent indicates whether a student had an average daily attendance rate of 90 percent or lower (excluding excused absences).

Table 2

School-Level Descriptive Statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
Student N	1,482	415.8	332.7	2	2,448
Pct. Student Took Arts Course	1,388	0.618	0.371	0	1
Arts FTEs	1,472	1.856	1.985	0	16
School Arts Partners	1,283	1.556	1.658	0	8
Number Arts Disciplines	1,355	2.618	1.116	1	5
Visual	1,355	0.801	0.399	0	1
Music	1,355	0.742	0.438	0	1
Theater	1,355	0.439	0.496	0	1
Dance	1,355	0.401	0.490	0	1
Media	1,355	0.235	0.424	0	1

Note: The Arts Expansion survey was constructed such that eight was the maximum number of school arts partners that a school could report.

Table 3

Effects of Students Taking an Arts Course

Sample	Attendance	Suspended	ELA	Math
Full Sample	0.002***	0.003***	0.001	-0.002
	(0.000)	(0.001)	(0.003)	(0.003)
	496,246	496,246	210,644	212,511
K-5	0.002***	0.003	-0.002	0.007
	(0.000)	(0.002)	(0.007)	(0.007)
	199,347	199,347	103,769	104,798
6-12	0.001	0.004***	0.026***	0.010*
	(0.000)	(0.001)	(0.005)	(0.004)
	296,898	296,898	106,875	107,713
Female	0.001***	0.002	0.001	-0.002
	(0.000)	(0.001)	(0.005)	(0.004)
	241,778	241,778	103,119	103,923
Male	0.002***	0.005**	-0.001	-0.002
	(0.000)	(0.002)	(0.005)	(0.005)
	254,457	254,457	107,521	108,584
Economically Disadvantaged	0.002***	0.003*	0.001	-0.005
	(0.000)	(0.001)	(0.004)	(0.004)
	373,934	373,934	163,403	164,733
ELL	0.002**	0.001	-0.008	-0.009
	(0.001)	(0.002)	(0.007)	(0.006)
	139,014	139,014	57,696	59,453
IEP	0.004***	0.008**	-0.014	-0.012
	(0.001)	(0.003)	(0.008)	(0.007)
	97,415	97,415	42,651	42,776
African-American	0.003***	0.004*	0.004	-0.005
	(0.001)	(0.002)	(0.006)	(0.005)
	178,078	178,078	71,796	72,267
Hispanic/Latinx	0.002***	0.004*	-0.000	-0.005
	(0.001)	(0.002)	(0.005)	(0.005)
	199,094	199,094	87,628	88,506
White	0.001	0.005*	0.005	0.016
	(0.001)	(0.002)	(0.011)	(0.010)
	65671	65,671	28,788	28,843
Chronically Absent	0.006***	0.007**	-0.009	-0.009
	(0.001)	(0.002)	(0.006)	(0.006)
	127,978	127,978	53,176	53,451

Note: *** statistically significant (two-tailed) at $p < 0.01$; ** significant at $p < 0.05$; * significant at $p < 0.10$; robust standard errors in parentheses; sample size provided below standard errors.

Table 4

Effects of Elementary School Subgroup Students Taking an Arts Course

Sample	Attendance	Suspended	ELA	Math
K-5	0.002***	0.003	-0.002	0.007
	(0.000)	(0.002)	(0.007)	(0.007)
	199347	199347	103769	104798
Female	0.002***	0.002	-0.002	0.010
	(0.001)	(0.002)	(0.010)	(0.010)
	96529	96529	50749	51223
Male	0.002***	0.003	-0.001	0.004
	(0.000)	(0.003)	(0.010)	(0.010)
	102817	102817	53019	53574
Economically Disadvantaged	0.002***	0.002	0.002	0.006
	(0.000)	(0.002)	(0.008)	(0.008)
	156345	156345	81925	82635
ELL	0.002**	0.002	0.001	0.011
	(0.001)	(0.002)	(0.012)	(0.012)
	71327	71327	33968	34896
IEP	0.003**	0.004	-0.015	0.011
	(0.001)	(0.005)	(0.017)	(0.017)
	40468	40468	21352	21430
African-American	0.003***	0.003	0.004	0.024*
	(0.001)	(0.003)	(0.012)	(0.011)
	66132	66132	34930	35191
Hispanic/Latinx	0.002***	0.003	-0.001	0.002
	(0.001)	(0.002)	(0.010)	(0.010)
	87358	87358	44951	45447
White	-0.001	-0.002	-0.024	-0.009
	(0.001)	(0.004)	(0.028)	(0.026)
	26476	26476	13617	13663
Chronically Absent	0.006***	0.009*	0.016	0.008
	(0.001)	(0.004)	(0.014)	(0.014)
	41197	41197	22489	22613

Note: *** statistically significant (two-tailed) at $p < 0.01$; ** significant at $p < 0.05$; * significant at $p < 0.10$; robust standard errors in parentheses; sample size provided below standard errors.

Table 5

Effects of Secondary School Subgroup Students Taking an Arts Course

Sample	Attendance	Suspended	ELA	Math
6-12	0.001	0.004***	0.026***	0.010*
	(0.000)	(0.001)	(0.005)	(0.004)
	296,898	296,898	106,875	107,713
Female	0.000	0.001	0.030***	0.009
	(0.001)	(0.002)	(0.006)	(0.006)
	145,249	145,249	52,370	52,700
Male	0.001*	0.007***	0.021***	0.011
	(0.001)	(0.002)	(0.006)	(0.006)
	151,639	151,639	54,502	55,010
Economically Disadvantaged	0.002**	0.004*	0.022***	0.004
	(0.001)	(0.002)	(0.005)	(0.005)
	217,589	217,589	81,478	82,098
ELL	0.001	-0.001	-0.005	-0.020*
	(0.001)	(0.003)	(0.010)	(0.009)
	67,686	67,686	23,728	24,557
IEP	0.004**	0.010**	-0.014	-0.020*
	(0.001)	(0.004)	(0.010)	(0.009)
	56,946	56,946	21,299	21,346
African-American	0.002**	0.005*	0.035***	0.005
	(0.001)	(0.002)	(0.008)	(0.007)
	111,946	111,946	36,866	37,076
Hispanic/Latinx	0.000	0.005*	0.008	-0.003
	(0.001)	(0.002)	(0.007)	(0.006)
	111,735	111,735	42,677	43,059
White	0.001	0.006*	0.047***	0.037**
	(0.001)	(0.003)	(0.013)	(0.012)
	39,195	39,195	15,171	15,180
Chronically Absent	0.003**	0.008*	-0.005	-0.005
	(0.001)	(0.003)	(0.008)	(0.007)
	86,781	86,781	30,687	30,838

Note: *** statistically significant (two-tailed) at $p < 0.01$; ** significant at $p < 0.05$; * significant at $p < 0.10$; robust standard errors in parentheses; sample size provided below standard errors.

Table 6

School-Level Arts Resource and Opportunity Analysis

	Attendance	Suspensions	ELA	Math
% Students taking Arts Courses	0.004	0.009	-0.056	-0.011
	(0.003)	(0.005)	(0.031)	(0.034)
	1,388	1,388	992	991
Number of Arts Disciplines	-0.000	-0.000	0.002	-0.002
	(0.001)	(0.001)	(0.006)	(0.008)
	1,356	1,356	1,002	1,000
Number of Arts FTEs	0.001	-0.001	0.003	0.010
	(0.001)	(0.002)	(0.007)	(0.008)
	1,354	1,354	973	971
Number of Arts Partners	0.000	-0.001	0.002	0.004
	(0.001)	(0.001)	(0.006)	(0.006)
	1,284	1,284	934	933

Note: *** statistically significant (two-tailed) at $p < 0.01$; ** significant at $p < 0.05$; * significant at $p < 0.10$; robust standard errors in parentheses; sample size provided below standard errors.

Table 7

Student School-Level Climate Survey Outcomes

	Arts Enthusiasm	School Belonging	Learning Engagement	School Safety
% Students taking Arts Courses	0.057	0.062	0.045	-0.029
	(0.085)	(0.050)	(0.034)	(0.034)
	320	528	528	528
Number of Arts Disciplines	0.007	-0.004	-0.009	-0.005
	(0.015)	(0.008)	(0.008)	(0.006)
	294	341	341	341
Number of Arts FTEs	0.025	-0.004	0.003	-0.005
	(0.020)	(0.009)	(0.007)	(0.006)
	321	472	472	472
Number of Arts Partners	0.002	0.005	0.005	-0.003
	(0.020)	(0.006)	(0.005)	(0.005)
	286	516	516	516

Note: *** statistically significant (two-tailed) at $p < 0.01$; ** significant at $p < 0.05$; * significant at $p < 0.10$; robust standard errors in parentheses; sample size provided below standard errors.

Table 8

Teacher School-Level Climate Survey Outcomes

	Student Engagement	Parent Engagement	Community Engagement	Student Relations	Teacher Collegiality
% Students taking Arts Courses	0.203*	0.243**	-0.105	-0.047	0.092
	(0.096)	(0.087)	(0.101)	(0.118)	(0.111)
	516	516	384	384	516
Number of Arts Disciplines	0.019	0.011	-0.008	-0.014	0.020
	(0.017)	(0.015)	(0.020)	(0.025)	(0.027)
	556	556	356	356	556
Number of Arts FTEs	0.035	0.010	-0.040	-0.006	0.043
	(0.018)	(0.017)	(0.026)	(0.023)	(0.029)
	465	465	391	391	465
Number of Arts Partners	0.013	0.014	-0.010	0.000	0.023
	(0.013)	(0.012)	(0.014)	(0.018)	(0.020)
	524	524	343	343	524

Note: *** statistically significant (two-tailed) at $p < 0.01$; ** significant at $p < 0.05$; * significant at $p < 0.10$; robust standard errors in parentheses; sample size provided below standard errors.

Appendix

Table A1

Student Climate Survey Outcomes: Items and Reliability

Outcome	Items	Cronbach's Alpha
Arts Enthusiasm	• If your friends or family wanted to go to an art museum, how interested would you be in going? • If your friends or family wanted to go to a play, how interested would you be in going?	0.64
School Belonging	• School is a place where I feel like I belong • I make friends easily at school • Students here are helpful to each other • Other students at school seem to like me • People at school care about me	0.79
Learning Engagement	• I pay attention in class • When I am in class, I concentrate on doing my work • When I am in class, I work as hard as I can • It is important to succeed in my classes • I am interested in learning new things • I participate in class activities • I complete homework assignments	0.89
School Safety	• Are you ever afraid at school? (reverse coded) • Do other students treat you with respect? • Do other students tease you or make fun of you? (reverse coded) • Do you ever feel bullied or threatened at school? (reverse coded)	0.71

Table A2

Teacher Climate Survey Outcomes: Items and Reliability

Outcome	Items	Cronbach's Alpha
Student Engagement	• Students are willing to put in the work it takes to get good grades. • Students try hard to improve on previous work.	0.83
Parent Engagement	• The parents of most of your students are active in the school's parent organization. • Most of your students' parents/guardians talk with you about their child's grades. • Most parents encourage you to maintain high standards. • Parents advocate for school improvement at this school. • Parents of your students help check their child's homework.	0.87
School-Community Engagement	• How effectively does this school connect with immigrant families, providing translation when necessary? • How effectively does this school respond to the needs and values of the surrounding community? • To what extent are all groups of parents represented in the governance of the school? • Overall, how effectively does this school connect with the community?	0.86
Student Relations	• How often are students bullied at school? (reverse coded) • How often are students bullied because of who they are? (reverse coded) • Overall, how unkind are students to each other? (reverse coded) • How much do students at this school care about each other? • How often do students at this school help each other learn? • How well do students at this school get along with each other? • At this school, how respectful are students to each other?	0.91
Teacher Collegiality	• Teachers help and support each other. • Teachers respect the professional competence of their colleagues. • There is a great deal of cooperative effort among the staff members. • Teachers at this school collaborate to plan instruction. • Teachers at this school are eager to share information about what does and does not work in their classrooms. • You are respected by other staff members.	0.89

Table A3

Effects of Students Taking an Arts Course on Student Suspensions

Sample	Suspended Ever	Suspended Days	In School Suspended Days	Out of School Suspended Days
Full Sample	0.003***	0.003	0.001*	0.002
	(0.001)	(0.002)	(0.000)	(0.002)
	496,246	496,246	496,246	496,246
K-5	0.003	0.006	0.001	0.005
	(0.002)	(0.003)	(0.001)	(0.003)
	199,347	199,347	199,347	199,347
6-12	0.004***	0.007**	0.001	0.006*
	(0.001)	(0.003)	(0.001)	(0.002)
	296,898	296,898	296,898	296,898
Female	0.002	0.001	0.000	0.001
	(0.001)	(0.002)	(0.001)	(0.002)
	241,778	241,778	241,778	241,778
Male	0.005**	0.006	0.002**	0.004
	(0.002)	(0.003)	(0.001)	(0.003)
	254,457	254,457	254,457	254,457
Economic Disad.	0.003*	0.001	0.001*	0.000
	(0.001)	(0.002)	(0.001)	(0.002)
	373,934	373,934	373,934	373,934
ELL	0.001	-0.000	0.001	-0.002
	(0.002)	(0.004)	(0.001)	(0.003)
	139,014	139,014	139,014	139,014
IEP	0.008**	0.003	0.003	0.000
	(0.003)	(0.006)	(0.001)	(0.006)
	97,415	97,415	97,415	97,415
African-American	0.004*	0.004	0.000	0.003
	(0.002)	(0.004)	(0.001)	(0.004)
	178,078	178,078	178,078	178,078
Hispanic/Latinx	0.004*	0.004	0.002**	0.002
	(0.002)	(0.003)	(0.001)	(0.003)
	199,094	199,094	199,094	199,094
White	0.005*	0.007	0.001	0.006
	(0.002)	(0.004)	(0.001)	(0.004)
	65,671	65,671	65,671	65,671
Chronically Absent	0.007**	0.008	0.002	0.006
	(0.002)	(0.005)	(0.001)	(0.005)
	127,978	127,978	127,978	127,978

Note: *** statistically significant (two-tailed) at $p < 0.01$; ** significant at $p < 0.05$; * significant at $p < 0.10$; robust standard errors in parentheses; sample size provided below standard errors.